SIGNAMAX
CONNECTIVITY SYSTEMS

Signamax™ Connectivity Systems
065-7940 24-Port with 2 Combo SFP Ports Gigabit Ethernet Switch

User's Guide

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Preface

The manual is divided into sections that describe the system installation and operating instructions with examples.

Introduction - A description of the physical features of the switch, including LED indicators, ports and panel descriptions.

Installation – A description of the physical installation of the switch including connecting the switch to the network and connecting stacked switch groups.

Connecting the switch – A description of how to connect your switch to an end node, hub, switch or backbone server.

Technical Specifications - The technical specifications of the Gigabit Ethernet Switch.

Intended Readers

The manual contains information for setup and management of the Gigabit Ethernet switch. This guide is intended for network managers familiar with network management concepts and terminology.

Notes, Notices, and Cautions

NOTE: A NOTE indicates important information that helps you make better use of your device.

NOTICE: A NOTICE indicates either potential damage to hardware or loss of data and tells you how to avoid the problem.

CAUTION: A CAUTION indicates the potential for property damage, personal injury, or death.

Safety Instructions

Use the following safety guidelines to ensure your own personal safety and to help protect your system from potential damage. Throughout this safety section, the caution icon ( ) is used to indicate cautions and precautions that you need to review and follow.

Safety Cautions

To reduce the risk of bodily injury, electrical shock, fire, and damage to the equipment, observe the following precautions.

Observe and follow service markings. Do not service any product except as explained in your system documentation. Opening or removing covers that are marked with the triangular symbol with a lightning bolt may expose you to an electrical shock. Only a trained service technician should service components inside these compartments.

If any of the following conditions occur, unplug the product from the electrical outlet and replace the part or contact your trained service provider:

– The power cable, extension cable, or plug is damaged.

– An object has fallen into the product.

– The product has been exposed to water.

– The product has been dropped or damaged.

– The product does not operate correctly when you follow the operating instructions.

- Keep your system away from radiators and heat sources. Also, do not block cooling vents.

- Do not spill food or liquids on your system components, and never operate the product in a wet environment. If the system gets wet, see the appropriate section in your troubleshooting guide or contact your trained service provider.
- Do not push any objects into the openings of your system. Doing so can cause a fire or an electric shock by shorting out interior components.
- Use the product only with approved equipment.
- Allow the product to cool before removing covers or touching internal components.
- Operate the product only from the type of external power source indicated on the electrical ratings label. If you are not sure of the type of power source required, consult your service provider or local power company.
- To help avoid damaging your system, be sure the voltage selection switch (if provided) on the power supply is set to match the power available at your location:

  – 115 volts (V)/60 hertz (Hz) in most of North and South America and some Far Eastern countries such as South Korea and Taiwan

  – 100 V/50 Hz in eastern Japan and 100 V/60 Hz in western Japan

  – 230 V/50 Hz in most of Europe, the Middle East, and the Far East
- Also be sure that attached devices are electrically rated to operate with the power available in your location.
- Use only approved power cable(s). If you have not been provided with a power cable for your system or for any AC-powered option intended for your system, purchase a power cable that is approved for use in your country. The power cable must be rated for the product and for the voltage and current marked on the product's electrical ratings label. The voltage and current rating of the cable should be greater than the ratings marked on the product.

- To help prevent an electric shock, plug the system and peripheral power cables into properly grounded electrical outlets. These cables are equipped with three-prong plugs to help ensure proper grounding. Do not use adapter plugs or remove the grounding prong from a cable. If you must use an extension cable, use a 3-wire cable with properly grounded plugs.
- Observe extension cable and power strip ratings. Make sure that the total ampere rating of all products plugged into the extension cable or power strip does not exceed 80 percent of the ampere ratings limit for the extension cable or power strip.
- To help protect your system from sudden, transient increases and decreases in electrical power, use a surge suppressor, line conditioner, or uninterruptible power supply (UPS).
- Position system cables and power cables carefully; route cables so that they cannot be stepped on or tripped over. Be sure that nothing rests on any cables.
- Do not modify power cables or plugs. Consult a licensed electrician or your power company for site modifications. Always follow your local/national wiring rules.
- When connecting or disconnecting power to hot-pluggable power supplies, if offered with your system, observe the following guidelines:

  – Install the power supply before connecting the power cable to the power supply.

  – Unplug the power cable before removing the power supply.

  – If the system has multiple sources of power, disconnect power from the system by

  unplugging *all* power cables from the power supplies.
- Move products with care; ensure that all casters and/or stabilizers are firmly connected to the system. Avoid sudden stops and uneven surfaces.

General Precautions for Rack-Mountable Products

Observe the following precautions for rack stability and safety. Also refer to the rack installation documentation accompanying the system and the rack for specific caution statements and procedures.

Systems are considered to be components in a rack. Thus, "component" refers to any system as well as to various peripherals or supporting hardware.

CAUTION: Installing systems in a rack without the front and side stabilizers installed could cause the rack to tip over, potentially resulting in bodily injury under certain circumstances. Therefore, always install the stabilizers before installing components in the rack.

After installing system/components in a rack, never pull more than one component out of the rack on its slide assemblies at one time. The weight of more than one extended component could cause the rack to tip over and may result in serious injury.

- Before working on the rack, make sure that the stabilizers are secured to the rack, extended to the floor, and that the full weight of the rack rests on the floor. Install front and side stabilizers on a single rack or front stabilizers for joined multiple racks before working on the rack.

Always load the rack from the bottom up, and load the heaviest item in the rack first.

Make sure that the rack is level and stable before extending a component from the rack.

Use caution when pressing the component rail release latches and sliding a component into or out of a rack; the slide rails can pinch your fingers.

After a component is inserted into the rack, carefully extend the rail into a locking position, and then slide the component into the rack.

Do not overload the AC supply branch circuit that provides power to the rack. The total rack load should not exceed 80 percent of the branch circuit rating.

Ensure that proper airflow is provided to components in the rack.

Do not step on or stand on any component when servicing other components in a rack.

NOTE: A qualified electrician must perform all connections to DC power and to safety grounds. All electrical wiring must comply with applicable local or national codes and practices.

CAUTION: Never defeat the ground conductor or operate the equipment in the absence of a suitably installed ground conductor. Contact the appropriate electrical inspection authority or an electrician if you are uncertain that suitable grounding is available.

CAUTION: The system chassis must be positively grounded to the rack cabinet frame. Do not attempt to connect power to the system until grounding cables are connected. Completed power and safety ground wiring must be inspected by a qualified electrical inspector. An energy hazard will exist if the safety ground cable is omitted or disconnected.

Protecting Against Electrostatic Discharge

Static electricity can harm delicate components inside your system. To prevent static damage, discharge static electricity from your body before you touch any of the electronic components, such as the microprocessor. You can do so by periodically touching an unpainted metal surface on the chassis.

You can also take the following steps to prevent damage from electrostatic discharge (ESD):

1. When unpacking a static-sensitive component from its shipping carton, do not remove the component from the antistatic packing material until you are ready to install the component in your system. Just before unwrapping the antistatic packaging, be sure to discharge static electricity from your body.
2. When transporting a sensitive component, first place it in an antistatic container or packaging.
3. Handle all sensitive components in a static-safe area. If possible, use antistatic floor pads, workbench pads and an antistatic grounding strap.

Introduction

Ethernet Technology
Switch Description
Features
Ports
Front-Panel Components
Side Panel Description
Rear Panel Description
Gigabit Combo Ports

Ethernet Technology

Fast Ethernet Technology

The growing importance of LANs and the increasing complexity of desktop computing applications are fueling the need for high performance networks. A number of high-speed LAN technologies are proposed to provide greater bandwidth and improve client/server response times. Among them, Fast Ethernet, or 100BaseT, provides a non-disruptive, smooth evolution from 10BaseT technology.

100Mbps Fast Ethernet is a standard specified by the IEEE 802.3 LAN committee. It is an extension of the 10Mbps Ethernet standard with the ability to transmit and receive data at 100Mbps, while maintaining the Carrier Sense Multiple Access with Collision Detection (CSMA/CD) Ethernet protocol.

Gigabit Ethernet Technology

Gigabit Ethernet is an extension of IEEE 802.3 Ethernet utilizing the same packet structure, format, and support for CSMA/CD protocol, full duplex, flow control, and management objects, but with a tenfold increase in theoretical throughput over 100Mbps Fast Ethernet and a one hundred-fold increase over 10Mbps Ethernet. Since it is compatible with all 10Mbps and 100Mbps Ethernet environments, Gigabit Ethernet provides a straightforward upgrade without wasting a company's existing investment in hardware, software, and trained personnel.

The increased speed and extra bandwidth offered by Gigabit Ethernet are essential to coping with the network bottlenecks that frequently develop as computers and their busses get faster and more users use applications that generate more traffic. Upgrading key components, such as your backbone and servers to Gigabit Ethernet can greatly improve network response times as well as significantly speed up the traffic between your subnetworks.

Gigabit Ethernet enables fast connections to support video conferencing, complex imaging, and similar data-intensive applications. Likewise, since data transfers occur 10 times faster than Fast Ethernet, servers outfitted with Gigabit Ethernet NIC's are able to perform 10 times the number of operations in the same amount of time.

In addition, the phenomenal bandwidth delivered by Gigabit Ethernet is the most cost-effective method to take advantage of today and tomorrow's rapidly improving switching and routing internetworking technologies.

Switching Technology

Another key development pushing the limits of Ethernet technology is in the field of switching technology. A switch bridges Ethernet packets at the MAC address level of the Ethernet protocol transmitting among connected Ethernet or fast Ethernet LAN segments.

Switching is a cost-effective way of increasing the total network capacity available to users on a local area network. A switch increases capacity and decreases network loading by making it possible for a local area network to be divided into different *segments* that do not compete with each other for network transmission capacity, giving a decreasing the load on each segment.

The switch acts as a high-speed selective bridge between the individual segments. Traffic that needs to go from one segment to another is automatically forwarded by the switch, without interfering with any other segments. This allows the total network capacity to be multiplied, while still maintaining the same network cabling and adapter cards.

For Fast Ethernet or Gigabit Ethernet networks, a switch is an effective way of eliminating problems of chaining hubs beyond the "two-repeater limit." A switch can be used to split parts of the network into different collision domains, for example, making it possible to expand your Fast Ethernet network beyond the 205-meter network diameter limit for 100BaseTX networks. Switches supporting both traditional 10Mbps Ethernet and 100Mbps Fast Ethernet are also ideal for bridging between existing 10Mbps networks and new 100Mbps networks.

Switching LAN technology is a marked improvement over the previous generation of network bridges, which were characterized by higher latencies. Routers have also been used to segment local area networks, but the cost of a router and the setup and maintenance required make routers relatively impractical. Today's switches are an ideal solution to most kinds of local area network congestion problems.

Switch Description

The Gigabit Ethernet Switch unit is equipped with twenty-four ports providing dedicated 10, 100 or 1000 Mbps bandwidth. These ports can be used for connecting PCs, servers, hubs and other Ethernet devices. The twenty-four tri-speed ports use standard twisted pair cabling and are ideal for segmenting networks into small, connected subnets. Each port can support up to 2000 Mbps of throughput in full-duplex mode. This stand-alone Switch enables the network to use some of the most demanding multimedia and imaging applications concurrently with other user applications without creating bottlenecks.

Features

- Twenty-four 10/100/1000BaseT Gigabit ports for connections to server or network backbone
- IEEE 802.3 compliant
- IEEE 802.3ab compliant
- IEEE 802.3u compliant
- IEEE 802.3x flow control for full duplex mode
- Full and half-duplex for both 10Mbps and 100Mbps connections. Full-duplex allows the switch port to simultaneously transmit and receive data, and only works with connections to full-duplex capable end stations and switches. Connections to a hub must take place at half-duplex
- Store and forward switching scheme capability to support rate adaptation and protocol conversion
- Data forwarding rate 14,880 pps per port at 100% of wire-speed for 10Mbps speed
- Data forwarding rate 148,810 pps per port at 100% of wire-speed for 100Mbpsspeed
- Data forwarding rate 1,488,100 pps per port at 100% of wire-speed for 1000Mbps speed

- Data filtering rate eliminates all error packets, runts, etc. at 14,880 pps per port at 100% of wire-speed for 10Mbps speed
- Data filtering rate eliminates all error packets, runts, etc. at 148,810 pps per port at 100% of wire-speed for 100Mbps speed
- Data filtering rate eliminates all error packets, runts, etc. at 1,488,100 pps per port at 100% of wire-speed for 1000Mbps speed
- Layer 2 switching based on MAC address
- Address handling: auto-learning, auto-aging
- MAC Address table: Support addresses up to 8K
- A packet buffer size of 400 Kbytes
- Auto-negotiation (NWay) between 10/100/1000 Mbps, half-duplex or full duplex and flow control for 10/100/1000BaseT ports.
- Gigabit ports support connection bypass mode

Ports

- Twenty-four high-performance NWay Ethernet ports, all of which operate at 10/100/1000 Mbps for connections to end stations, servers and hubs. All ports can auto-negotiate between 10Mbps, 100Mbps and 1000Mbps at full or half duplex.
- Two Gigabit Ethernet Combo ports for making 1000BaseT and Mini GBIC connections

Front-Panel Components

The front panel of the Switch consists of LED indicators, 24 (10/100/1000 Mbps) Ethernet ports and 2 Mini GBIC Combo ports.

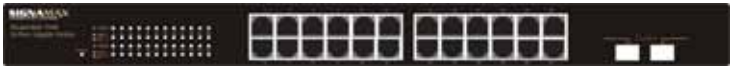
Front Panel View of the switch as shipped

Comprehensive LED indicators display the status of the switch and the network.

Two Mini GBIC Combo ports for connections to server or network backbone.

LED Indicators

The LED indicators of the Switch include Power, 1000M and Link/Act. The following shows the LED indicators for the Switch along with an explanation of each indicator.



LED Indicators

Power	This indicator on the front panel should be lit during the Power-On Self Test (POST). It will light green approximately 2 seconds after the switch is powered on to indicate the ready state of the device.
1000M	This indicator on the front panel will light solid green for a port transferring at 1000Mbps. If this LED is dark, the port will be transferring at 10/100Mbps
Link/Act	Each on-board Gigabit Ethernet port has a corresponding indicator. This will light steady green for a valid link and blink whenever there is reception or transmission (i.e. Activity--Act) of data occurring at a port.

Rear Panel Description

The rear panel of the switch contains an AC power connector.

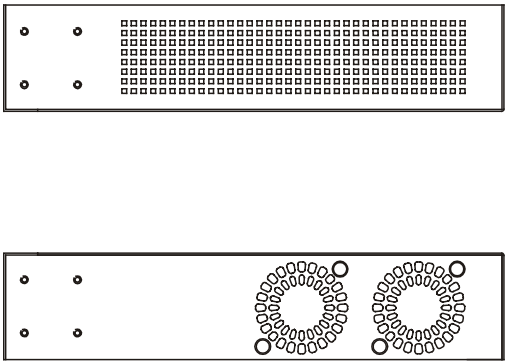
Rear panel view of the Switch

The AC power connector is a standard three-pronged connector that supports the power cord. Plug-in the female connector of the provided power cord into this socket, and the male side of the cord into a power outlet. The switch automatically adjusts its power setting to any supply voltage in the range from 100 ~ 240 VAC at 50 ~ 60 Hz.

Side Panel Description

The right-hand side panel of the Switch contains two system fans. The left-hand side panel contains heat vents.

The system fans are used to dissipate heat. The sides of the system also provide heat vents to serve the same purpose. Do not block these openings, and leave at least 4 inches of space at the rear and sides of the switch for proper ventilation. Without proper heat dissipation and air circulation, system components might overheat, which could lead to system failure.



Side Panels (the left-hand panel is pictured on top)

Gigabit Combo Ports

In addition to the 24 10/100/1000 Mbps ports, the Switch features two Mini GBIC Combo ports. These two ports are 10/100/1000BaseT copper ports (built-in) and Mini GBIC ports (optional). The two Mini GBIC port modules are plugged into the Switch. Please note that the Mini GBIC ports are used instead of the built-in 10/100/1000BaseT ports. The Mini GBIC ports will not work simultaneously with its corresponding 10/100/1000BaseT port. For example, if port 24 is used on the Mini GBIC module, port 24 is not available for the 10/100/1000BaseT built-in port, and vice versa.

Installation

Package Contents
Before You Connect to the Network
Installing the Switch Without the Rack
Rack Installation
Power On

Package Contents

Open the shipping carton of the Switch and carefully unpack its contents. The carton should contain the following items:

- One Gigabit Ethernet Switch
- One AC power cord
- The user's manual
- Mounting Kit (two brackets and screws)
- Four rubber feet with adhesive backing

If any item is missing or damaged, please contact your local Reseller for replacement.

Before You Connect to the Network

The site where you install the Switch may greatly affect its performance. Please follow these guidelines for setting up the Switch.

- Install the Switch on a sturdy, level surface that can support at least 6.6 pounds (3 kg) of weight. Do not place heavy objects on the Switch.
- The power outlet should be within 6 feet (1.82 meters) of the Switch.
- Visually inspect the power cord and see that it is fully plugged in and secured to the AC power port.
- Make sure that the Switch is allowed proper heat dissipation and adequate ventilation. Leave at least 4 inches (10 cm) of space at the front and rear of the Switch for ventilation.
- Install the Switch in a fairly cool and dry place for the acceptable temperature and humidity operating ranges.
- Install the Switch in a site free from strong electromagnetic field generators (such as motors), vibration, dust, and direct exposure to sunlight.
- When installing the Switch on a level surface, attach the rubber feet to the bottom of the device. The rubber feet cushion the Switch, protect the casing from scratches and prevent it from scratching other surfaces.

Installing the Switch Without the Rack

When installing the Switch on a desktop or shelf, the rubber feet included with the Switch should first be attached. Attach these cushioning feet on the bottom at each corner of the device. Allow enough ventilation space between the Switch and any other objects in the vicinity.

Installing the Switch in a Rack

The Switch can be mounted in a standard 19" rack. Fasten the mounting brackets to the Switch using the screws provided. With the brackets attached securely, you can mount the Switch in a standard rack.

Power On

Plug one end of the AC power cord into the power connector of the Switch and the other end into the local power source outlet.

After the Switch is powered on, the LED indicators will momentarily blink. This blinking of the LED indicators means the system is resetting.

Power Failure

As a precaution, in the event of a power failure, unplug the Switch. When power is resumed, plug the Switch back in.

Connecting The Switch

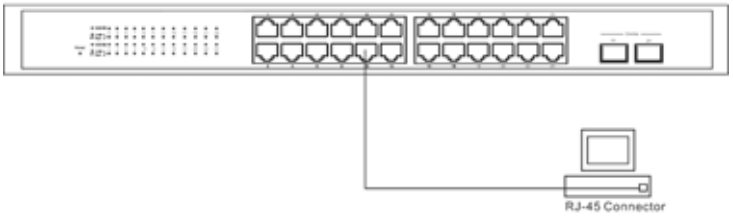
Switch To End Node
Switch To Hub or Switch
Connecting To Network Backbone or Server

NOTE: All twenty-four (24) high-performance NWay Ethernet ports can support both MDI-II and MDI-X connections.

Switch To End Node

End nodes include PCs, routers and other network devices outfitted with a 10, 100 or 1000 Mbps RJ-45 Ethernet/Fast Ethernet/Gigabit Ethernet ports.

An end node can be connected to the Switch via a twisted-pair Category 3, 4, or 5 (or better) UTP/STP cable. The end node can be connected to any of the ports of the Switch.



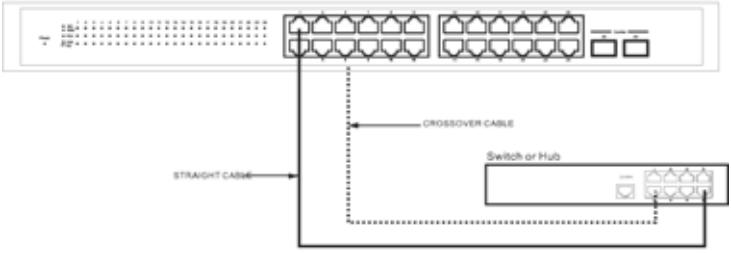
Switch connected to an end node

The **Link/Act** LEDs for each UTP port light green when the link is valid. The LED over the port label indicates a port speed of either 10/100 Mbps or 1000Mbps. A blinking LED on the bottom indicates packet activity on that port.

Switch to Hub or Switch

These connections can be accomplished in a number of ways using a Standard Ethernet patch cable.

- A 10BaseT hub or switch can be connected to the Switch via a twisted-pair Category 3, 4 or 5 UTP/STP cable.
- A 100BaseTX hub or switch can be connected to the Switch via a twisted -pair Category 5 UTP/STP cable.
- A 1000BaseTX switch can be connected to the Switch via a twisted -pair Category 5 (or better) UTP/STP cable.



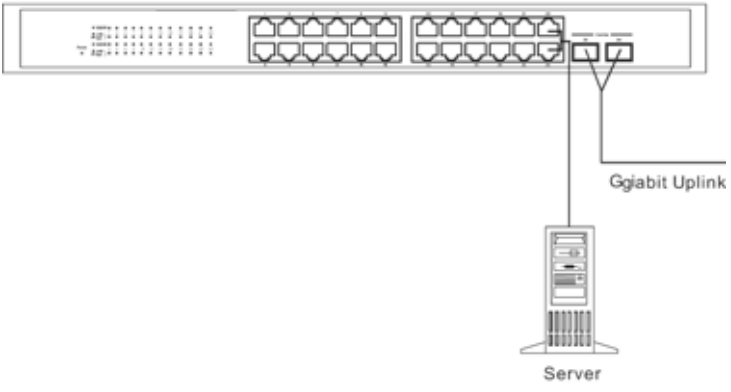
Switch connected to a port on a hub or switch using either a straight or crossover cable–any standard Ethernet cable is fine

Connecting To Network Backbone or Server

The Mini GBIC ports are ideal for uplinking to a network backbone or network server. These ports operate at 1000 Mbps in full-duplex mode.

Connections to the Mini GBIC ports are made using a fiber optic cable. A valid connection is indicated when the Link LED is lit.

The switch with 2 1000BaseX Mini GBIC Combo ports:



Gigabit connection using optional module port

Technical Specifications

General

Standard	IEEE 802.3 10BaseT Ethernet IEEE 802.3u 100BaseTX Fast Ethernet IEEE 802.3ab 1000BaseT Gigabit Ethernet IEEE 802.3x Full-duplex Flow Control IEEE 802.3 Nway auto-negotiation
Protocols	CSMA/CD
Data Transfer Rates: **Ethernet** **Fast Ethernet** **Gigabit Ethernet**	Half-duplex / Full-duplex 10 Mbps / 20Mbps 100Mbps / 200Mbps n/a / 2000Mbps
Topology	Star
Network Cables	UTP Cat.5 for 100Mbps UTP Cat.3, 4, 5 for 10Mbps UTP Cat. 5e (or better) for 1000Mbps EIA/TIA-568 100-ohm shield twisted-pair (STP)(100m)
Ports	24 10/100/1000BaseT Gigabit Ethernet ports in front panel 2 Mini GBIC Combo ports in front panel (Shared with 2 10/100/1000BaseT ports)

Physical & Environmental

AC inputs:	100 - 240 VAC, 50/60 Hz (internal universal power supply)
Power Consumption:	33.3 watts maximum

DC fans:	2 built-in 40 x 40 x10 mm fan
Operating Temperature:	32 to 104 degrees Fahrenheit (0 to 40 degrees Celsius)
Storage Temperature:	-13 to 131 degrees Fahrenheit (-25 to 55 degrees Celsius)
Humidity:	Operating: 5% to 95% RH non-condensing Storage: 0% to 95% RH non-condensing
Dimensions:	441 mm x 210 mm x 43 mm (1U), 19 inch rack-mount width
Weight:	4.96 pounds (2.25 Kg)
EMI:	FCC Class A, CE Mark, C-Tick
Safety:	CSA International

Performance

Transmission Method:	Store-and-forward
RAM Buffer:	400 Kbytes per device
Filtering Address Table:	8K MAC address per device
Packet Filtering/ Forwarding Rate:	Full-wire speed for all connections. 14,880 pps for 10M, 148,809 pps for 100M, 1,488,095 pps for 1000M
MAC Address Learning:	Automatic update.
Forwarding Table Age Time:	Default = 300.

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